

## PATENT SPECIFICATION



Convention Date (Sweden): Nov. 11, 1937.

521,268

Application Date (in United Kingdom): Nov. 10, 1938. No. 32708/38.

Complete Specification Accepted: May 16, 1940.

## COMPLETE SPECIFICATION

## Improvements in or relating to Headlamps for Automobiles and similar Vehicles

We, **ARTIFABOLAGET TIMBRO**, of Karlavägen 85, Stockholm, Sweden, a body corporate organised under the laws of Sweden, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Headlamps for automobiles and similar vehicles are as a rule controllable in such a way that the beam of light can be directed in either of two different inclinations or paths so that either good distant illumination or good near illumination can be obtained. The main object of this controllability is that, normally, when driving at high speed, the headlamps should be so adjusted that good distant illumination is obtained, but that, when approaching another vehicle, usually with reduction of speed and in order to avoid dazzling the driver of the other vehicle, the headlamps should be "dipped" for good near illumination.

Distant illumination ensures that it is possible to see not only the road surface but also the surroundings above and on each side of the road surface. For instance, woods, telegraph posts and the like, situated at the side of the road, can afford useful guidance concerning approaching curves, or other variations in the road which otherwise would perhaps be difficult to observe. For this purpose the light from the headlamp for distant illumination should radiate in such a manner that not only objects below the horizontal plane passing through the headlamps are illuminated, but that there is also a certain amount of illumination above the said horizontal plane. The illumination above the horizontal plane will, however, cause dazzling of approaching drivers and therefore may cause accidents.

In order to avoid this disadvantage, provision is made for switching on, instead of the light for distant illumination, a light which is arranged in such a way that it does not illuminate any objects above the horizontal plane pass-

ing through the headlamps. This, in turn, has the result that the driver of the vehicle cannot maintain the same speed as he had no longer the same good view of the road at the greater distance. As the driver has thus more reason to confine his attention to the road immediately in front of the vehicle, the last-named light should be so directed that it gives an even illumination of the road immediately in front of the vehicle, for instance, for about 50 yards.

It has before been proposed in headlamps to provide two sources of light and shielding means arranged so that rays from one source are directed on to an upper reflector part and rays from the other source on to a lower reflector part, the two sources being spaced along the axis of the double reflector so that one source provides near illumination and the other distant illumination, and the two sources being provided by double filaments in a single lamp bulb. In such prior proposals, however, the two reflector parts are not separated by a partition definitely confining the rays from each source to the respective reflector part and no screen is provided for preventing rays from the upper reflector part from radiating above a horizontal plane passing through the axis of the headlamp.

It has furthermore been proposed to use for near illumination a headlamp containing a concentrated, or substantially concentrated source of light, such as an incandescent filament, surrounded by a reflector having certain characteristics. This reflector is so formed that a vertical section through the reflector is of approximately parabolic shape at the back part, which shape becomes more elliptical the nearer it comes to the opening of the reflector. It may be said that in effect the reflector is built up of small ring segments cut perpendicularly to the optical axis of the reflector and if desired in the order of magnitude of a differential, each segment being cut from an ellipsoid the focal distance of which is smaller the nearer it is to the opening of the reflector.

[Price 1/-]

Price 4s 6d

The object of the present invention is to provide a convenient and practical embodiment of a combined headlamp, providing alternatively near or distant illumination, in which the reflector for near illumination is at least in part of the above-mentioned kind.

According to the invention, in a headlamp for automobiles and similar vehicles, comprising an upper reflector part and a source of light associated therewith for near illumination and a lower reflector part and a source of light associated therewith for distant illumination, the upper and lower reflector parts are separated by a partition arranged so as positively to confine the light from each source of light to the respective reflector part, a screen also being provided in such a way as to prevent light from the upper reflector part radiating in a direction above the horizontal plane passing through the axis of the headlamp.

The invention is hereinafter described by way of example with reference to the accompanying diagrammatic drawings, in which:—

Figures 1 and 2 are vertical sections diagrammatically illustrating two alternative embodiments according to the invention; and

Figure 3 shows an incandescent lamp bulb adapted for use in connection with the lamp according to Figure 1.

In Figure 1 the lower part 11 of the reflector 10 is substantially parabolic, whereas the upper part of the reflector, indicated at 12, is ellipsoidal or is more or less of ellipsoidal form. The focus of the parabolic part 11 is indicated at 13, and the inner focus of the more or less ellipsoidal reflector at 14. At each focus a source of light is located. The rays, emanating from the source of light at the focus 13 and indicated at 15, 16 and 17, are reflected in parallel due to the known properties of the parabola and produce a beam for distant illumination. A partition 18 is arranged to extend through the reflector, so as to divide the parabolic part 11 from the ellipsoidal part 12. It is convenient to provide depressions 19 and 20 in the partition 18, for the accommodation of the sources of light for the lower and upper parts, respectively, of the reflector, so that no radiation will take place from the source of light at the focus 13 upwards against the ellipsoidal part 12 of the reflector.

The rays from the source of light at the focus 14 of the ellipsoidal part 12 of the reflector are reflected by this reflector downwards onto the surface of the ground and therefore provide near illumination. This is shown, for instance, by the rays

indicated at 21, 22 and 23, in order to prevent rays, such as is indicated at 24, from causing dazzling effects when the headlamp is switched for near illumination, the upper part 12 of the reflector is continued to form a screen 25 extending down to the horizontal plane through the foci 13, 14. However, instead of this extension, a hood for the headlamp outside the reflector could be used to form such a screen. Between the screen 25 and the screen 18 a protective glass 26 is provided, through which the rays from the source of light 14 pass, after having been reflected by the upper part 12 of the reflector.

The rays of light emanating from the source of light at the focus 13 and reflected by the lower part 11 of the reflector, should be radiated entirely in parallel, as indicated by the rays at 15, 16 and 17, if the lower part of the reflector were a perfect paraboloid. This, however, would result in a concentrated illumination at a point distant from the vehicle. A certain amount of spreading of the beam of light, both in elevation and laterally, is desirable but it should be observed that the lateral spreading should always be somewhat greater than the spreading in elevation. This desirable spreading can be obtained by giving the parabolic part 11 of the reflector a slightly inexact form or a form which is only little different from the theoretically correct form, but it may also be secured by arranging a protective covering 26<sup>11</sup> in front of the parabolic reflector, said covering being provided with integral spreading elements. If desired, both of these means for obtaining spreading can be employed.

In order to use the light from the sources of light at the foci 13 and 14, most effectively, it is advantageous to provide at least the cup-shaped depressions 19 and 20 with a reflecting surface. If desired, the whole of the partition 18 may be made reflecting, although this is not of such great importance.

A lamp of the kind described above will in one position give very good near illumination and in the other position very good distant illumination. It may often happen, however, that a certain, although limited, amount of near illumination is desirable at the same time as distant illumination. This is particularly the case when driving at high speed on a bad road surface where it is of importance to avoid stones, holes and other irregularities in front of the tyres. If the lamp is set for distant illumination it is usually not possible in the dark to observe such irregularities.

It may for this reason be advantageous to provide for a fainter source of near illumination which functions at the same time as the distant illumination. This latter source of light can be cut off when it is not required. By experiments it has been found that a suitable power of this last-mentioned source of near illumination is about one third of the power of the normal source of light for normal near illumination and of the source of light for distant illumination, respectively. The power of the two last named should be about the same as one another.

In the modification shown in Figure 2, the ellipsoidal or approximately ellipsoidal part 39 of the reflector, together with its source of light 40, as well as the parabolic or approximately parabolic part 41 of the reflector, together with its source of light 42 are mounted within a casing 38. The two sources of light in this case are constituted by two different incandescent lamps. Otherwise, this modified arrangement functions the same as that according to Figure 1 and for that reason the same reference numerals have been used for similar parts.

In Figure 3 an incandescent lamp 3, suitable for use in the arrangement of Figure 1, is shown. This incandescent lamp comprises a bayonet socket 27 and a glass bulb 28 fixed thereto. Within the glass bulb a screen 29 is mounted, such screen being provided with three cup-shaped depressions 19<sup>a</sup>, 20<sup>a</sup> and 30. The cup-shaped depressions 19<sup>a</sup> and 20<sup>a</sup> accommodate the filaments forming the two sources of light at the foci 13, 14 in the arrangement according to Figure 1. The cup-shaped depression 30 contains an auxiliary incandescent filament 31 with lower power than both of the other incandescent filaments, and intended for near illumination, this filament being switched on permanently or temporarily with the filament for distant illumination. One end of all of the incandescent filaments is fixed to the metallic screen 29 which is connected to the outer covering of the socket by means of a supporting rod 32. The other end of the filament 14 is by means of wire 33 connected to one of the contacts 34 of the socket, whereas the free ends of the filaments 13 and 31 are by means of wires 35 and 36, respectively, connected to the other bottom contact 37. In this case therefore it has been assumed that the filaments 31 and 13 would always be giving light simultaneously. If this should not be desirable, it is necessary to provide for a third bottom contact and the two filaments 13 and 31 would be connected one to this third bottom contact and the other to the

bottom contact 37.

It will be understood that the invention is not limited to the particular embodiments hereinbefore described and that the reflector parts and sources of illumination may be otherwise suitably arranged in accordance with the invention.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Headlamp for automobiles and similar vehicles, comprising an upper reflector part and a source of light associated therewith for near illumination, and a lower reflector part and a source of light associated therewith for distant illumination, and a partition separating the upper and lower reflector parts and arranged so as positively to confine the light from each source of light to the respective reflector part, a screen also being provided in such a way as to prevent light from the upper reflector part radiating in a direction above a horizontal plane passing through the axis of the headlamp.

2. Headlamp according to Claim 1, characterised in that the two sources of light are constituted by incandescent elements screened from each other and mounted within a single incandescent lamp bulb.

3. Headlamp according to Claim 2, characterised in that the two incandescent elements are separated from each other by means of a partition extending in the longitudinal direction of the lamp.

4. Headlamp according to any of the preceding claims, characterised in that the sources of light or incandescent elements are accommodated in cup-shaped depressions in the partition.

5. Headlamp according to Claim 4, characterised in that at least the cup-shaped depressions, and if desired the whole of the partition, are provided with light-reflecting surfaces.

6. Headlamp according to any of the preceding claims, characterised in that besides the source of light for distant illumination and the source of light for near illumination there is provided an auxiliary source of light for near illumination for use, permanently or temporarily, at the same time as the source of light for distant illumination.

7. Headlamp according to Claim 6, characterised in that the auxiliary source of light for near illumination has a power of approximately one third of the power of the source of light for distant illumination.

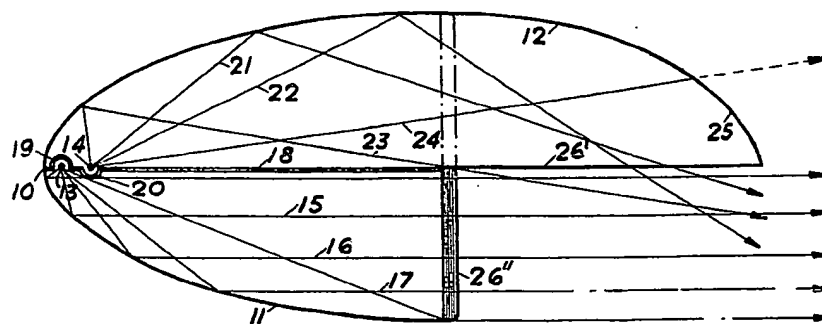
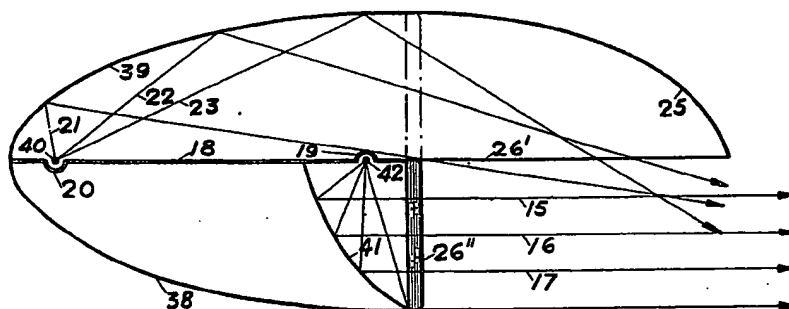
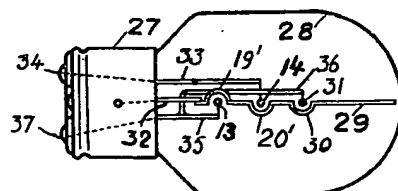
8. Headlamp according to Claim 1, characterised in that a screen is arranged as a forward continuation of the upper part of the reflector or of the headlamp casing. 5
9. The improved headlamp for automobiles and similar vehicles, constructed substantially as hereinbefore described with reference to Figure 1 of the accompanying diagrammatic drawings. 10
10. The improved headlamp for automobiles and similar vehicles, constructed substantially as hereinbefore described with reference to Figure 2 of the accompanying diagrammatic drawings. 15
11. In or for a headlamp according to any of the preceding Claims 1 to 9, a lamp bulb provided with one filament for distant illumination and one or two filaments for near illumination and a screen separating the filaments for distant and near illumination, constructed substantially as hereinbefore described with reference to Figure 3 of the accompanying diagrammatic drawings. 20 25

Dated this 10th day of November, 1938.

HARDINGHAM & URQUHART  
DYKES.

75, Chancery Lane, London, W.C.2,  
Chartered Patent Agents.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1940.

Fig. 1.Fig. 2.Fig. 3.

Malby &amp; Sons, Photo-Lith.